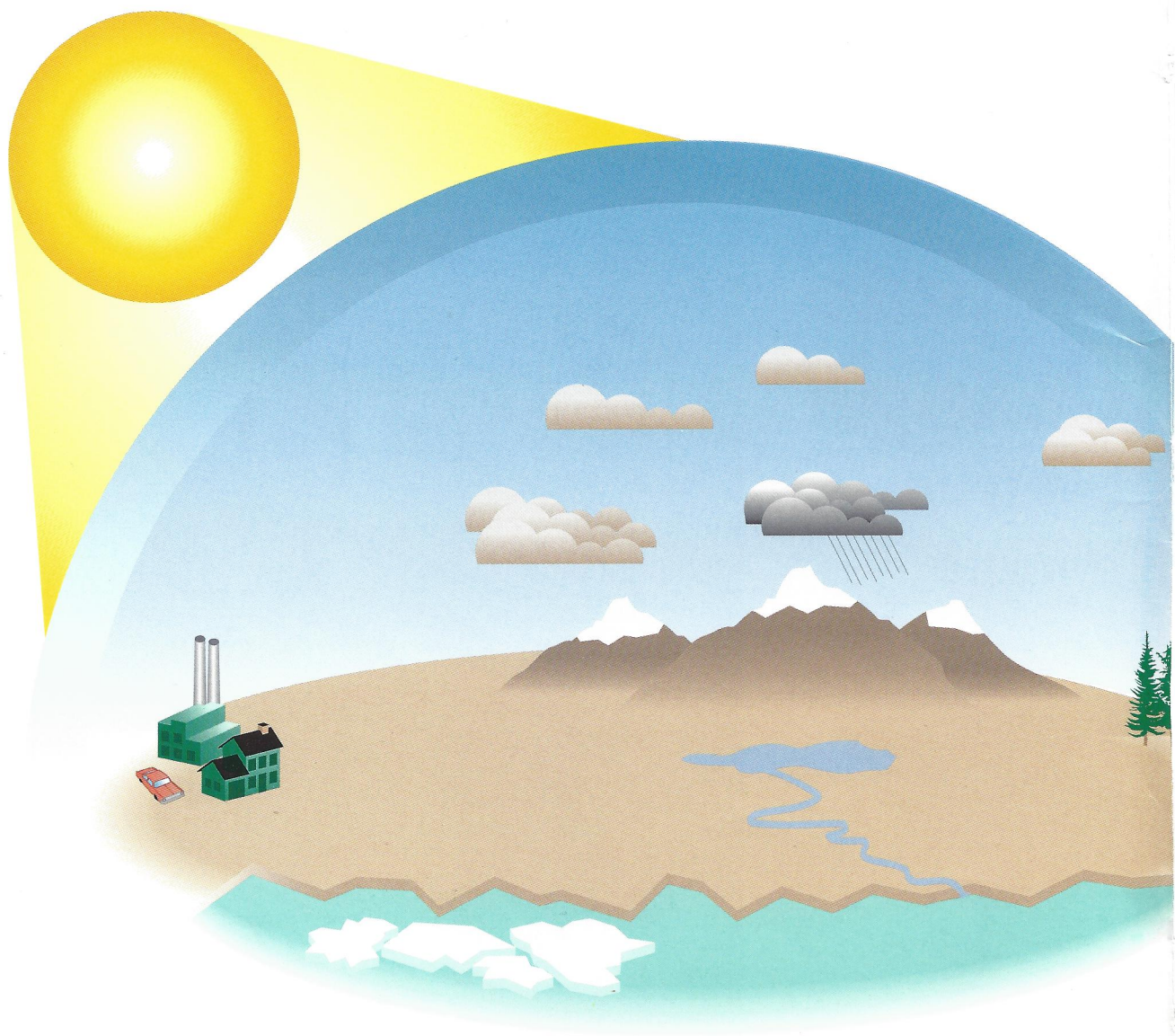



**Global
climate
change**
*everyone's
debate*



EXXON







Exxon shares with people around the world the goal of protecting Earth's environment. We take seriously our responsibility to conduct our operations in an environmentally sound way. For that reason, for many years, we've carefully studied and worked to increase understanding of the issue of global climate change — often referred to as “global warming.” It's one of the knottiest and most contentious scientific subjects. Essentially, the question is whether the use of fossil fuels — oil, natural gas and coal — is causing Earth's temperature to rise beyond normal variation.

Our analysis indicates that the current state of climate science is too uncertain to provide clear answers to many key questions about global climate change. Even if global warming were a proven threat — which it is not — targets agreed on in Kyoto, Japan, fail to provide a fair, practical or cost-effective solution.

Because fossil fuels account for about 90 percent of the energy people use in the world today and form the basis for economic growth, everybody has a stake in the debate. Clearly, Exxon employees, shareholders and customers are especially affected.

This booklet will help inform you about the science, economics and other aspects of the issue. It will tell you about the many steps Exxon and others are taking — from research to reforestation.

We hope to gain your interest in this matter, and we encourage you to join the important debate about global climate change.



Lee R. Raymond

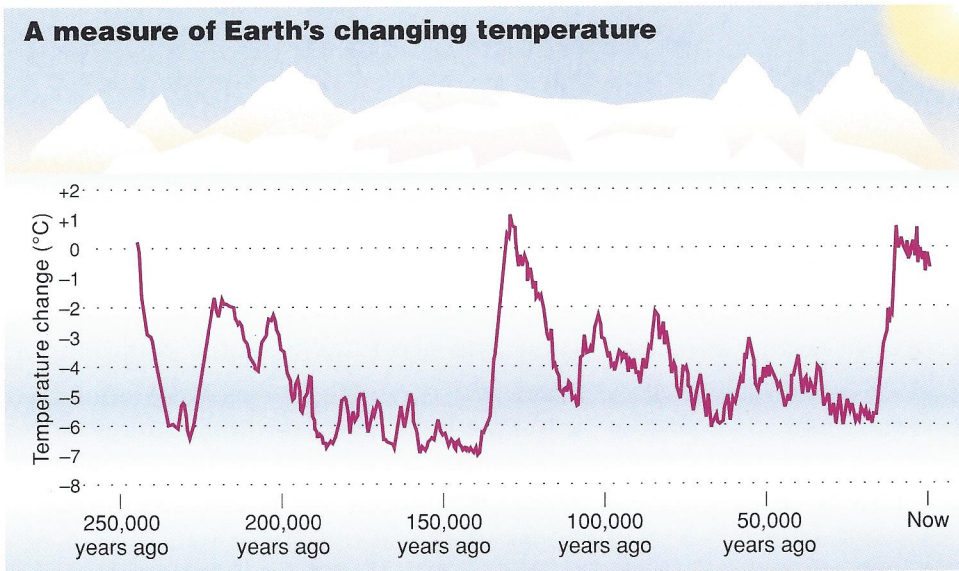
Lee R. Raymond
Chairman

Climate change — It isn't new

Earth's climate is affected by many complex variables, such as sunlight, clouds, rain, wind, ice, storms, lightning, volcanoes, comets, magnetic fields and living organisms, including humans. Throughout history, climate has fluctuated between periods of cooling and periods of warming. Some of those changes lasted hundreds of years, others hundreds of thousands.

Over the past century, we've seen a slight warming trend of one-half degree Celsius (about one degree Fahrenheit). This recent warming trend falls well within the range of the natural changes in Earth's temperature over the past 250,000 years. The debate about climate change

A measure of Earth's changing temperature



Source: National Oceanic and Atmospheric Administration

Ice core samples from Antarctica provide evidence of long-term changes in Earth's temperature.

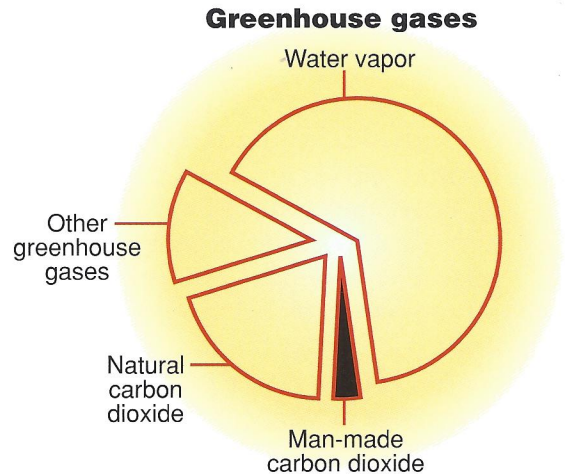
concerns whether this recent warming is primarily connected with our use of fossil fuels — coal, oil and natural gas.

The greenhouse effect

Scientists concerned about global warming point to the greenhouse effect, a proven natural phenomenon. Water vapor and carbon dioxide and other gases trap some of the sun's energy, creating a warming, or greenhouse, effect. Without it, Earth would be too cold to sustain life.

The vast majority of the greenhouse effect is created by water vapor, over which we have little or no control. The second leading cause is carbon dioxide, or CO₂. Every living human and animal continuously breathes in oxygen and breathes out CO₂.

Nearly all CO₂ emissions come from natural sources. Only a small amount comes from burning fossil fuels.



Sources of greenhouse gases

Fossil fuels and the climate

Does the tiny portion of greenhouse gases caused by burning fossil fuels have a measurable effect on worldwide climate? No one knows for sure. That's the crux of the debate.

In 1995, a special United Nations panel set up to study global climate change issued an extensive report on the issue. In keeping with the practice of publishing research findings, peers in the scientific community reviewed the report before it was released. The scientists were careful not to make any firm conclusions about the connection between burning fossil fuels and global warming.

However, the executive summary of the report, the part most people read, was heavily influenced by participants who are not scientists. The summary, which was not peer-reviewed, states that the balance of evidence suggests a discernible human influence on climate. But many scientists say that a great deal of uncertainty still needs to be resolved.

Scientific uncertainties

One cause of the uncertainty stems from the fact that much of the one-degree rise in temperature over the past century occurred before 1940, but most of the increase in the use of fossil fuels occurred after World War II.

Also, the methods used to measure temperature raise other ques-

tions. Land-based measurements showed several years of record temperature during the 1990s. However, sensitive satellite measurements by the National Aeronautics and Space Administration indicated no significant warming or cooling between 1979 and 1998. Widely reported temperature increases in 1998 appear to be due mainly to El Niño.

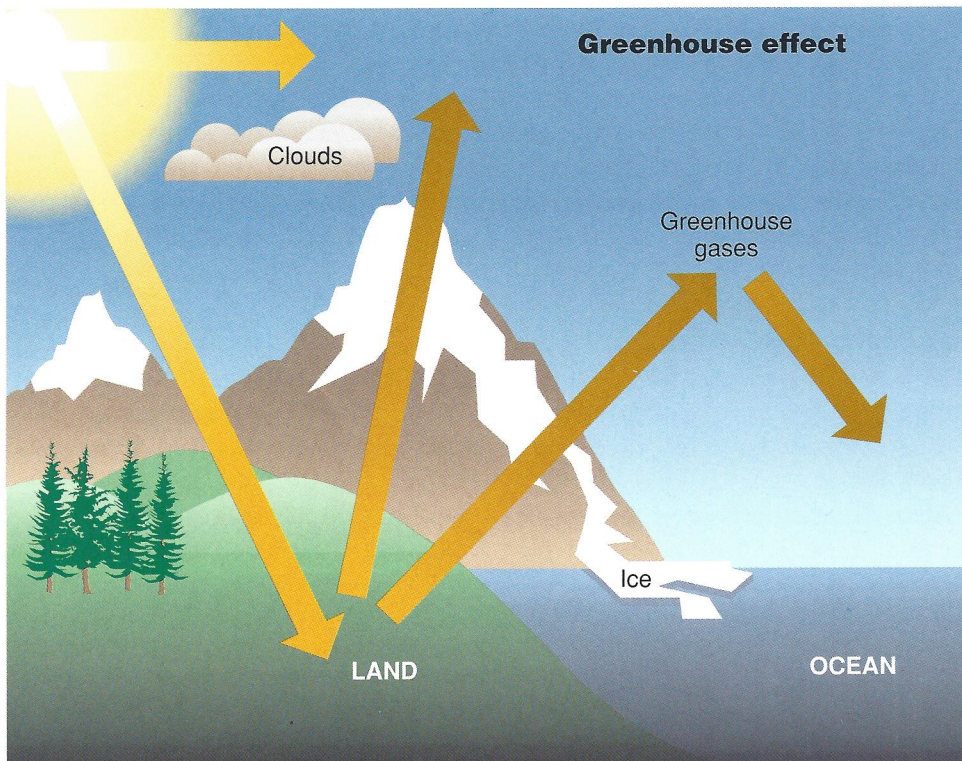
Forecasts of global warming come from complex computer models that try to predict the future. They do not adequately explain past climate change. Many of the variables are not well understood, and projections range widely.

The many uncertainties in the science of climate have led one leading researcher, Professor Ronald Prinn of the Massachusetts Institute of Technology (MIT), to conclude: “There is no doubt that our present understanding of climate — and our ability to predict climate — are inadequate to provide a sharp focus for policymaking.”

The Kyoto Protocol

In December 1997, representatives from many governments attended policy meetings in Kyoto, Japan. Unfortunately, they ignored the scientific uncertainties and adopted steps to rein in CO₂ and other greenhouse gas emissions in some countries.

The agreement would commit 38 developed countries, including the



Greenhouse gases trap enough heat to make the world livable.

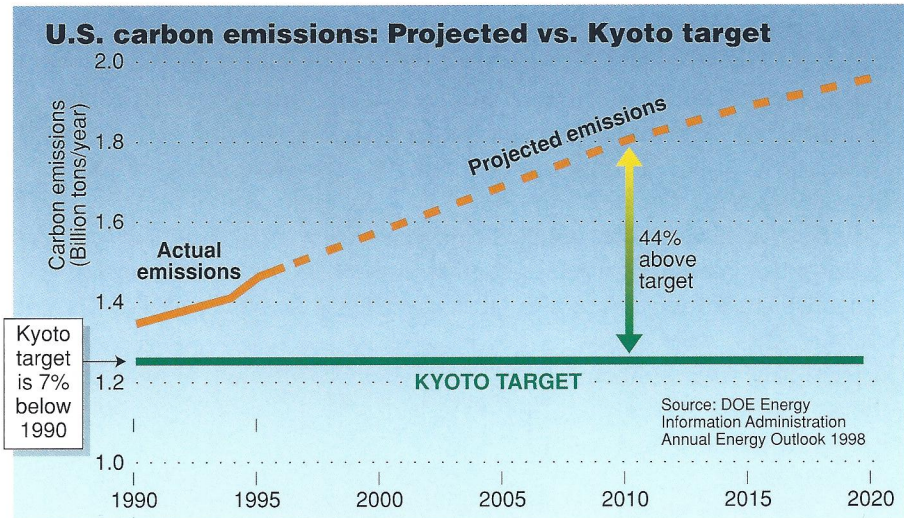
United States, to reduce their combined emissions an average of 5 percent below 1990 levels in the next 10 to 14 years. But the protocol excludes more than 130 developing countries from any commitments.

Effects of reducing CO₂ emissions

For the United States, the target is to reduce CO₂ emissions 7 percent below 1990 levels. Seven percent may not sound like much, but this means reducing emissions at a point in the future to where they were at a point in the past.

Here's another way of seeing it. Official U.S. government forecasts project that emissions in the year 2010 will exceed the Kyoto target

Emissions in the U.S. in the year 2010 are projected to be 44 percent higher than the target set by the Kyoto agreement.



by 44 percent. To get to the target, we would have to stop all driving in the U.S. or close all electric power plants or shut down every industry. Obviously, those are not realistic options.

Since economic growth and energy use are so closely tied, meeting the Kyoto target would clearly have a huge economic impact.

A government study of six key U.S. industries found that meeting the Kyoto targets would cause production and employment to drop significantly. Many other industries not included in the study would also be hurt.

Independent economists project that to get the targeted reductions in fossil-fuel use, price increases like these would be required: 40 percent for gasoline, 50 percent for home heating oil, 25 percent for electricity and 50 percent for natural gas. These and other price hikes could cost the average American family of four about \$2,700 a year.

At least some developed countries would probably have to impose significantly higher fossil fuel taxes, rationing or both.

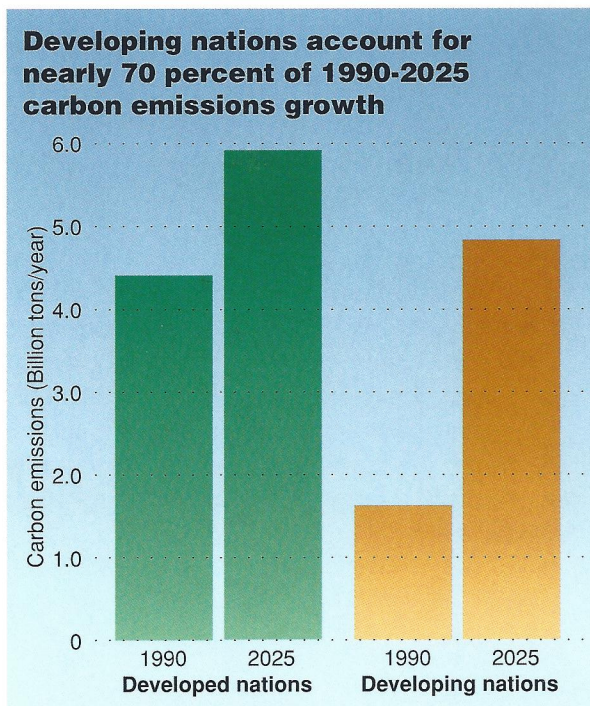
Developing countries

For developing countries, mixed impacts are expected. If the Kyoto restrictions economically impair industrialized countries, imports from developing nations will decline. That could significantly disrupt global trade and economic growth.

Because they would be exempt from requirements to cut CO₂ emissions, developing nations may attract more industry and jobs from industrialized countries that restrict fossil fuel consumption. That means fewer jobs in countries — the U.S., for example — that do impose such limits.

Projections show that most future emissions growth will come in the developing countries; including China, Mexico, Brazil and India. If burning fossil fuels proves to be a significant factor in global climate change, then exempting developing nations from the agreement raises issues of fairness and effectiveness.

On the other hand, developing countries face enormous challenges, such as alleviating poverty and raising living standards, extending life expectancy and expanding educational opportunities. Meeting these basic human needs requires economic



Source: U. N. Intergovernmental Panel on Climate Change

growth. And economic growth requires energy.

Developing countries have chosen to address these real and immediate quality-of-life problems instead of a potential problem whose existence, timing and severity have yet to be established.

Ratification of the agreement

The Kyoto protocol goes into force if it's ratified by at least 55 countries and by enough developed nations to represent collectively at least 55 percent of the 1990 CO₂ emissions of all developed nations. The 55 percent figure would allow the agreement to enter into force without ratification by the United States.

In the U.S., diverse groups — including labor, farming, consumers and many industries — have serious reservations about the agreement.

The U.S. Senate dramatically reflected those concerns before the Kyoto conference when it voted 95-0 to oppose any agreement that excludes developing countries or that seriously harms the U.S. economy. Yet the Kyoto agreement does both.

What should we do

The *potential* for climate change caused by elevated levels of carbon dioxide in the atmosphere is a legitimate concern, and reducing the scientific uncertainties is important. We should continue to research this issue. We also should continue to pursue efficient use of energy. Market-oriented policies and new technology can aid considerably in this process. And we can support projects that absorb CO₂ emissions and therefore prevent them from escaping into the atmosphere.

Let's take a closer look at each of these steps.

Knowledge through research

First, we need a thorough scientific understanding of climate change so we can have a strong foundation on which to base policy.

Professor Richard Schmalensee, a noted MIT economist, points out, "With our current understanding of the science and economics of climate, we know enough to take the global warming issue seriously. We don't, however, know enough to do anything drastic."

Fortunately, all indications are that climate change is a very long-term phenomenon. The U.S. Congressional Office of Technology Assessment concluded, “Delaying the implementation of emissions controls for 10 to 20 years will have little effect on atmospheric concentrations of greenhouse gas emissions.”

We can make good use of that time. Researchers will be able to gain a better understanding of climate science. And there’s a lot of research going on — about \$2 billion worth a year in the U.S. alone.

Exxon itself has funded studies by several major research organizations.

Market-driven efforts

Second, industries should continue their voluntary market-driven efforts to identify cost-effective ways to reduce energy use and emissions. Exxon and others are already working in areas such as energy efficiency and fuel switching — which means, for example, changing from coal to cleaner-burning natural gas.

At Exxon, our refineries and chemical plants are 35 percent more energy-efficient today than they were 25 years ago.

In addition, we operate or have an interest in 26 cogeneration plants around the world. Cogeneration makes steam and electricity simultaneously, using 30 percent less energy than making them separately.

A role for technology

Third, if it is determined that we do need to scale back CO₂ emissions, one of the best ways is through new technology.

As it becomes economic, advanced technology is one of the main tools industry is applying to reduce both energy use and CO₂ emissions.

Long-term research should continue to render substantial improvements — 50 percent to 100 percent — in energy efficiency.

One example is the partnership between Exxon and General Motors to develop gasoline-powered fuel cells for automobiles. Fuel cells may double a car’s gas mileage and sharply reduce emissions.

CO₂ absorption

Fourth, scientists are looking at ways to capture CO₂ emissions from fossil fuel use by absorbing them. One way is to plant more trees. They absorb CO₂ naturally and provide many other environmental

benefits. Exxon has been supporting reforestation programs for more than a decade. We have expanded our programs so that by the year 2000 we will have helped plant more than 2 million trees throughout the world.

Do we need an insurance policy?

Some people argue that the world needs to take out an insurance policy against the possibility of global warming — just in case.

In deciding whether to buy insurance, people carefully consider several key questions. What is the risk they're trying to protect against? How much does the policy cost? What would the policy do for them? When should they buy the policy?

Answering these questions about global climate change clarifies several points. Because of the scientific uncertainties, we don't have a clear understanding of the risks involved. The Kyoto agreement makes the cost of the policy high. No one can tell us with certainty what benefit we will gain. Thus, it doesn't seem to be a good time to buy the policy.

Exxon believes that sound science and sound economics should light the way as society addresses climate change. Patience is important as we allow facts to guide our course of action.

With such an approach, the world can resolve global climate change in a way that also keeps economies healthy and growing. But the first step is an open and honest debate on the issue. We urge you to get the facts and make your views known because everyone has a stake in the outcome.



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